CLAIMS

1. An illumination device for simulating neon lighting comprising

a substantially rod-like waveguide having a predetermined length with a lateral light receiving surface and a lateral curved light emitting surface having a predetermined circumferential width, said waveguide being comprised of a material that preferentially scatters light entering said light receiving surface such that a light intensity pattern exiting said light emitting surface has a major axis extending along said predetermined length and

an elongated light source extending along and positioned adjacent said light receiving surface and spaced from said light emitting surface a distance sufficient to cause said light intensity pattern to have a minor axis with a length extending substantially the entire circumferential width of said light emitting surface.

2. The illumination device of claim 1 in which said elongated light source is a multiplicity of spaced point light sources arranged in a line extending substantially along said light receiving surface, said point light sources are spaced from one another a distance sufficient to cause the light intensity pattern of each light source to overlap and form a collective light intensity pattern that appears substantially uniform along said length of said light emitting surface.

3. The illumination device of claim 2 in which said point light sources are light emitting diodes.

4. The illumination device of claim 3 in which said light emitting diodes have an oval shape with a major axis extending in a direction along said line.

5. The illumination device of claim 1 further including

a housing in which said light source is positioned, said housing extending along said light receiving surface and having a pair of side walls each with an interior light reflecting surface and an exterior light absorbing surface and

an electric connecting member positioned within said housing and adapted to connect said light source to a remote power source.

6. The illumination device of claim 5 in which said housing is adapted to be bent into a non-linear shape and said electric connecting member extends along the length of said housing and is sufficiently flexible so as to be bent to conform to the non-linear shape of said housing.

7. The illumination device of claim 6 in which said electric connecting member is a flexible ribbon.

8. The illumination device of claim 5 including a light transmitting material filling an interior space of said housing to maintain positioning of said light source and electric connecting member within said housing.

9. The illumination device of claim 8 in which said light transmitting material is transparent.

10. The illumination device of claim 8 in which said light transmitting material has light scattering characteristics.

11. The illumination device of claim 8 in which said light source are a plurality of light emitting diodes and said light transmitting material has an index of refraction essentially matching the index of refraction of said light emitting diodes.

12. The illumination device of claim 8 in which said light transmitting material forms a bottom wall extending along the length of said housing, said bottom wall having a light reflecting bottom surface for reflecting light incident thereon into said wave guide.

13. The illumination device of claim 8 in which said light transmitting material is a heat conductor.

14. The illumination device of claim 2 including a light transmitting spacer member positioned between said light source and said light receiving surface and in an substantially abutting relationship with said light source.

15. The illumination device of claim 5 in which said waveguide and said housing are integral and comprised of a impact resistant acrylic.

16. The illumination device of claim 3 wherein the light emitting diodes have housings aligned in an essentially upright position with an apex of each housing juxtaposed to said light receiving surface of said waveguide.

17. The illumination device of claim 3 wherein the light emitting diodes have housings tilted with respect to the length of the waveguide.

18. The illumination device of claim 3 wherein the light emitting diodes have housings arranged in an inverted positions with respect to said light receiving surface.

19. An illumination device comprising

(a) an optical waveguide having a predetermined length and a lateral surface and defining a housing extending substantially the entire predetermined length, said waveguide being fabricated of a material capable of being flexed;

(b) a string of spaced point light sources positioned within said housing and extending along the length thereof;

(c) an elongated circuit board positioned within said housing and electrically connected to said point light sources.

20. The illumination device of claim 19 wherein said point light sources are LEDs.

21. The illumination device of claim 20 in which said material preferentially scatters light entering said waveguide along its predetermined length.

22. The illumination device of claim 21 including a light transmitting material filling said interior space to maintain positioning of said LEDs and said circuit board within said housing.

23. An illumination device for simulating neon lighting comprising

a first light transmitting member of a predetermined length comprised of waveguide material having a substantially curved front surface, said waveguide material preferentially scattering light entering a first lateral surface so that light emitted by a second lateral surface has a light distribution pattern skewed along said length with light scattering characteristics;

a housing adjacent said waveguide with spaced side walls abutting said first lateral surface and defining a volume extending along said predetermined length of said first light transmitting member, said side walls provided with a light reflecting interior surface and a light absorbing exterior surface;

a multiplicity of spaced point light sources housed within said volume and extending along said predetermined length, said spaced light sources positioned a distance from said second lateral surface so as to minimize the viewing of localized

regions of high light intensity within said light distribution pattern. to have uniform along distribution providing transmission of a uniform light distribution pattern; and

an electrical source connecting member positioned within said volume and connected to said point light sources.

24. The illumination device of claim 23 in which interior surfaces of said side walls are covered with a light reflecting material and exterior surfaces are covered with a light absorbing material.

25. The illumination device of claim 23 in which said side walls are essentially parallel to each other.

26. The illumination device of claim 25 including a spacer member made of transparent material positioned and filling a portion of the volume between said point light sources and said member.

27. The illumination device of claim 23 in which said point light sources are LEDs.

28. The illumination device of claim 27 in which said electrical member is connected to a processor programmed to cause said LEDs to flash independently.

29. The illumination device of claim 28 in which the LEDs flash in a timed sequence.

30. The illumination device of claim 28 in which said LEDs are flashed in successive groups along the length of the first string thereby simulating movement.

31. The illumination device of claim 27 including a multiplicity of LEDs mounted in a second string positioned within said volume and extending in the direction of elongation of said housing, said second string connected with said electrical member so as to be independently energized.

32. The illumination device of claim 30 in which said LEDs of said first string are alternatively positioned along the length of said housing with said LEDs of said second string.

33. The illumination device of claim 31 in which said LEDs of said first string emit a different color of light from the LEDs of said second string.

34. A method of making an illumination device capable of simulating neon lighting comprising the steps of

forming a rod with a predetermined length and a pair of lateral surfaces from material having optical waveguide properties with preferential light scattering characteristics such that light entering a first of said lateral surfaces is caused to form an

elliptically shaped light intensity pattern that has a major axis in a direction substantially parallel to said predetermined length;

placing a housing having a pair of spaced side walls defining a volume in a connected relationship with said first lateral surface;

bending said rod and housing into a desired shaped;

positioning a plurality of spaced point light sources connected to a flexible electrical connecting member within said volume between said side walls; and

filling said volume with potting material transmitting light.

35. The method of claim 34 wherein said rod and housing are formed as an integral unit.

36. The method of claim 34 wherein said side walls have interior surfaces that are light reflecting.

37. The method of claim 34 in which said point light sources are LEDs.

38. The method of claim 37 in which said LEDs have transparent housings and said potting compound has an index of refraction essentially matching an index of refraction of said transparent housings.

39. The method of claim 37 in which said LEDs have tinted housings.

40. The method of claim 34 wherein said side walls have exterior surfaces that are light absorbing.